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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,007	04/16/2004	Hongxing Tang	CIT.PAU.46	9207

22428 7590 01/24/2007
FOLEY AND LARDNER LLP
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WASHINGTON, DC 20007

EXAMINER

NOORI, MAX H

ART UNIT	PAPER NUMBER
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2855

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/826,007	TANG ET AL.	
	Examiner	Art Unit	
	Max Noori	2855	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39,40,42-50,52-59 and 61-66 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39,40,42-50,52-59 and 61-66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/25 & 11/2/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 39, 42-50, 52-66, are rejected under 35 U.S.C. 103(a) as being unpatentable over Porter et al., in view of Lee et al.

Regarding claims 39, 50, Porter et al., discloses a hybrid micro cantilever sensor with features of the claimed invention including a cantilever a thin film piezoresistor elements, (col. 11, line 58), a detector for measuring the piezo's resistance change (see, for example, claim 40), and the detector is to detect the biological analyte (see, for example, col. 3, lines 46-48). Even though Porter et al., does not show a biofunctional cantilever, but since he suggest the use of various kinds of cantilever (col. 18, lines 25-34), it would have been obvious for a skilled artisan at the time of the invention to modify his device to use different configuration such as a biofunctional for more versatile effect. Porter et al., does neither elaborate on the nature of the piezo resistance, however, since they come in variety of shapes and forms, they could have use any desirable kind for any intended purpose. Furthermore, the use of thin metallic piezoresistor on a substrate is notoriously known. Fore example, Lee et al., is presented to show such assertion. Lee et al., discloses a thin film transistor with piezoelectric film, teaching the use of

metallic piezoresistor (see, for example, claim 1). Since porter et al., does not provide any limitation on the nature of the piezoresistor, it would have been obvious for a skilled artisan at the time of the invention to modify Porter using teachings of lee to provide for a thin metallic piezoresistor, in order to amplify the electric signal, and to achieve a more accurate result.

Regarding claims 42, 52, 62, the device is to detect the binding of the biological analyte from the resistance change of the piezoresistor.

Regarding claims 43-46, 53-56, the cantilever is a silicon nitride (see claim 21).

Regarding claims 47-49, 57-60, the thin film comprises similar materials (see col. 11, line 57), and similar size.

Regarding claims 61, 64, measuring is performed in time (col. 17, line 45).

Regarding claims 63, 65-66, porter et al., recite frequency consideration (see claims 4 or 5)

3. Claims 40 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porter et al., in view Lee and further in view of Atomic resolution with an atomic force microscope using piezoresistive detection" by Tortonese et al.

Regarding these claims porter/Lee, fails to explicitly disclose that the cantilever comprises a notched nanocantilever and the metal thin film piezoresistor is located on arm portions of the Tortonese et al. disclose a cantilever that comprises a notched nanocantilever and a piezoresistor located on arm portions of the nanocantilever adjacent the notch (Fig. 2a); It would have been obvious to one of ordinary skill in the art to modify the sensor of Porter et al.

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using the notched nanocantilever and piezoresistor placement of Tortonese et al. in order to expose' the piezoresistor to a greater strain for a given force, increasing sensitivity.

Response to Amendment

4. Applicant's amendment and arguments filed 11/2/06 have been fully considered but they are moot in view of the new ground of rejection.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

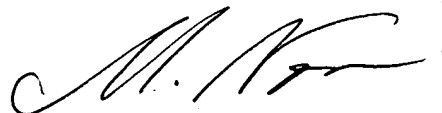
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Max H. Noori whose telephone number is (571) 272-2185. The examiner can normally be reached on Tuesday-Friday from 8:00 AM to 6:00 P.M.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-2800. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. The central fax number is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MHN

Friday, January 12, 2007



MAX NOORI
PRIMARY EXAMINER